

What is claimed is:

1. A device for delivery of aerosol particles to a patient comprising:
a first means for providing a first fluid comprising a first fluid entrance port
5 and a first fluid exit port at which the fluid is provided;
a pressure chamber for providing a pressurized fluid to an area surrounding
the first fluid exit port, the pressure chamber comprising a second fluid entrance port and a
second fluid exit port.

10 2. The device of claim 1, wherein the first means for providing the first fluid
is a feeding needle having a cylindrical channel therein whereby the first fluid entrance port and
first fluid exit port are each circular;
wherein the feeding needle exit port has a diameter in the range of from
about 0.002 to about 2 mm, and the pressure chamber exit port has a diameter in the range of
15 about 0.002 mm to about 2 mm.

3. The device of claim 1, wherein the first means for providing a first fluid is
a planar channel created between a first planar member surface and a second planar member
surface positioned parallel to the first planar member surface.

20

4. The device of claim 3 wherein the first planar member is further comprised
of a plurality of channels and the pressure chamber comprises a plurality of pressure fluid exit
ports positioned in front of a flow path of a channel;

wherein each channel has a diameter in the range of from about 0.01 mm to
25 about 0.4 mm and the pressure chamber exit port has a diameter in the range of about 0.01 mm
to about 0.25 mm.

5. The device of claim 1, wherein the exit opening of the first means for
providing a first fluid is positioned at a point in the range of about 0.002 mm to about 2 mm
30 from the second fluid exit port of the pressure chamber.

6. The device of claim 1, having inserted therein a first fluid having a dynamic viscosity in the range of from about 10^{-4} to about 1 kg/m/sec and further wherein the first fluid is comprised of a pharmaceutically active drug.

5 7. A method of delivering an aerosol to a patient, comprising:
forcing a pharmaceutically active liquid through a channel of a feeding
source in a manner which causes the liquid to be expelled from an exit opening;
forcing a gas through a pressure chamber in a manner which causes the gas
to exit the pressure chamber from an exit orifice in front of a flow path of the liquid expelled
10 from the exit opening of the feeding source;
wherein a stable liquid-gas interface is maintained and the liquid forms a
stable capillary jet focused on the exit orifice of the pressure chamber by the gas.

8. The method of claim 7, wherein the liquid has a viscosity in a range of from
15 about 10^{-4} to about 1 kg/m/sec and the gas is air.

9. The method of claim 7, wherein the liquid has a viscosity in a range of from
about 0.3×10^{-3} to about 5×10^{-2} kg/m/sec;
wherein the liquid is forced through the channel at a rate in a range of about
20 0.01 nl/sec to about 100 μ l/sec and further wherein the gas is forced through the opening of the
pressure chamber at a rate in the range of from about 50 m/sec to about 2000 m/sec.

10. The method of claim 7, wherein the liquid is forced through the channel at a
rate in a range of about 1 nl/sec to about 10 μ l/sec and further wherein the gas is forced
25 through the opening of the pressure chamber at a rate in the range of from about 100 to 500
m/sec.

11. The method of claim 7, wherein the feeding source is a cylindrical channel
and the liquid is expelled from an exit opening having a diameter in the range of from about
30 0.002 to about 2 mm and wherein the opening in the pressure chamber has a diameter in the

range of about 0.002 to about 2 mm and is positioned directly in front of a flow path of the exit opening of the channel.

12. The method of claim 11, wherein the exit opening has a diameter in the
5 range of from about 0.01 mm to about 0.4 mm, and
wherein the exit opening of the feeding source is separated by a distance of
from about 0.01 to about 2 mm from the exit opening in the pressure chamber.

13. The method of claim 11, wherein the opening in the pressure chamber has a
10 diameter in the range of about 0.005 mm to about 0.25 mm, and
wherein the exit opening of the feeding source is separated by a distance of
from about 0.002 to about 2 mm from the feeding point.

14. A method of delivering aerosolized particles of a pharmaceutically active
15 drug to a patient, comprising:
feeding liquid formulation comprised of a pharmaceutically active drug
through a liquid feeding source to an outlet;
feeding gas through an orifice positioned in front of the outlet in a direction
aligned with a direction of flow out of the outlet;
20 wherein the feeding of liquid and feeding of gas are each at a rate relative to
each other so as to maintain a stable capillary microjet of liquid which exits the orifice and
forms aerosolized particles having a size in the range of about 0.1 micron to about 10 microns.

15. The method of claim 14, wherein gas is forced into an area around the feeding
25 source outlet at a pressure in the range of 10 to 50,000 mBar above atmospheric pressure and
further wherein the liquid has a viscosity in the range of from 10^{-4} to 1 kg/m/sec.

16. The method of claim 15, wherein gas is forced into an area around the feeding
source outlet at a pressure in the range of 100-2000 mBar above atmospheric pressure.

17. The method of claim 15, wherein gas from the pressure chamber surrounds liquid exiting the feeding source outlet which liquid is drawn into the orifice concentrically being focused by the gas flowing out of the outlet, and further wherein the aerosolized particles formed are uniform in size to the extent of having a relative size standard deviation of 3 to 30%.

5

18. A monodisperse aerosol of particles of a pharmaceutically active drug, the particles characterized by having the same diameter with a deviation in diameter from one particle to another in a range of from about $\pm 3\%$ to $\pm 30\%$.

10

19. The monodisperse aerosol of claim 18, wherein the particles are comprised of a liquid formulation of the drug and a carrier and wherein the particles have a size in a range of from about 1 micron to about 5 microns.

15

20. The monodisperse aerosol of claim 18, wherein the particles are comprised of a dry powder of drug and wherein the particles have a size in a range of from about 1 micron to about 5 microns.